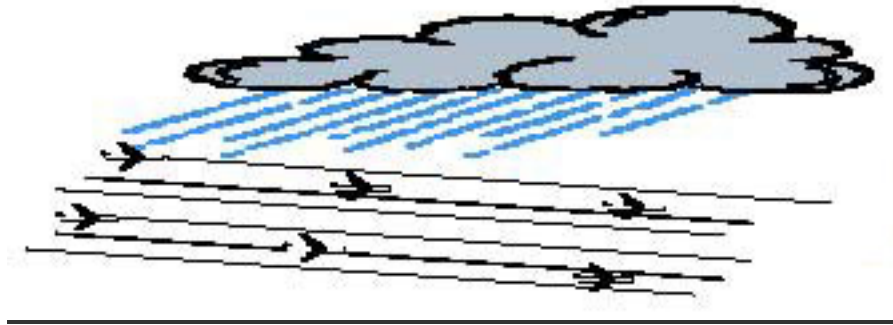


Airport Weather Conditions

AW-1 Maintain Runway Use in Reduced Visibility



The reduction in arrival and departure rates as weather deteriorates is primarily due to loss of optimal runway configurations, either because of runway spacing or inadequate instrument approach capabilities. The solution is to apply technology and procedures to achieve near optimum runway acceptance rates without regard for meteorological conditions. Instrument approach procedures will be published for runways that are capable of supporting them.

Capability will continue to increase as satellite navigation services become universally available over the United States airspace with upgrades to support instrument approaches. Airport improvements in runways, markings, and airport lights are necessary to match this increasing capability for approaches in poor visibility.

Key Dates

PRM Installed at 5 Sites	2002
Pilot Acceptance of SOIA (SFO)	2002
Certified WAAS/LAAS Avionics	2003
WAAS LNAV/VNAV Operations NAS Wide	2004
CAT I LAAS Operational at Key Airports	2004
CAT II/III LAAS Operational at Key Airports	2006
Over 500 Airports have LNAV/VNAV Procedures	2006
Over 2000 Airports have LNAV/VNAV Procedures	2010

AW-1 Solution Set

Optimize acceptance rates as weather deteriorates from Visual Meteorological Conditions (VMC) to Instrument Meteorological Conditions (IMC)

Background

There are two or more runway acceptance rates for each airport (based on benchmark analysis) – an optimum rate based on good weather conditions and reduced rates based on adverse weather conditions, which may include poor visibility, unfavorable winds, or heavy precipitation. Two underlying factors that affect airport operations in periods of reduced visibility are:

1. Lack of instrument approach procedure(s) available at the airport; and
2. Inability to maximize runway acceptance when visual separation can no longer be applied.

The goal is to achieve near optimum runway acceptance rates without regard for meteorological conditions. At airports without an existing instrument procedure, the publication of Area Navigation (RNAV)-based instrument approaches provides a new capability within the NAS. For those airports with existing procedures but non-optimum runway acceptance rates, other tools/operational implementations are required.

Ops Change Description

Arrival rates deteriorate as weather changes from visual to instrument conditions. This premise is founded on the ability to provide visual separation between aircraft and for aircraft to achieve visual spacing for the runway. This standard acceptance rate reduction applies to single and/or parallel runway operations where the runways are separated by 4,300 feet or more. Closely spaced parallel approaches is the term used to reference any approach involving aircraft that must operate closely together during the approach phase of flight where the runways are less than 4,300 feet apart. Special procedures are necessary for these approaches in instrument conditions. The implementation of Precision Runway Monitor (PRM) equipment and Simultaneous Offset Instrument Approaches (SOIA) for closely spaced parallel operations will allow recapturing some of this capability. PRM requires runways to be separated by 3,400 feet for straight in and 3,000 feet for offset operations. SOIA refers to the procedures used when runway centerlines are less than 3,000 feet apart.

Special approach procedures apply the enhanced surveillance capabilities and offsets to allow continued arrivals at higher than otherwise permitted capacities on closely spaced parallel runways. These procedures will be published for NAS runways that are capable of supporting them. Procedures for all scheduled air carrier airports will be completed by 2006.

Capability will continue to increase as satellite navigation services become universally available over the United States airspace with upgrades to support instrument approaches. Complementary airport improvements in runways, markings, and airport lights are necessary to enable this increasing capability for approaches in poor visibility.

Instrument approach procedures will be published for most runway ends capable of supporting them. Procedures for Part 139 (scheduled air carrier) airports will be completed by 2006; procedures for public airports with runways less than 5000 feet will be completed by 2010. Capability begins with GPS-based Lateral Navigation (LNAV) non-precision approaches and continually increases as Lateral Navigation/Vertical Navigation (LNAV/VNAV) precision approach services become universally available over the US airspace in the mid-term. Service will be upgraded to be capable of Category I operations in the long-term using Local Area Augmentation System (LAAS) and then Wide Area Augmentation System (WAAS).

New approach procedures will increase in both availability and usage as widespread equipment and operations are enabled by the new navigation service. Further, the implementation of these procedures provides a new stabilized descent capability for numerous airports, supporting the CAST initiative seeking to reduce controlled flight into terrain incidents. Increased usage of GPS-based RNAV procedures will increase efficiency at many airspace-constrained airports.

The following sections address operational changes described:

- AW-1.1: *Continue arrival operations as weather deteriorates from VMC to IMC by increasing instrument approach services.*
- AW-1.2: *Continue arrival operations to closely spaced parallel runway as weather deteriorates from VMC to IMC through the implementation of new services.*

Benefits, Performance and Metrics

- Throughputs in arrivals per hour are sustained at a higher level as the ceiling and visibility decrease.
- Increased runway acceptance rate, in arrivals per hour, under IMC weather conditions.

AW-1.1 Continue arrival operations as weather deteriorates from VMC to IMC by increasing instrument approach services.

Definition and Requirements for Instrument Approach Services

Due to the complexity of the terms used in this paper, a set of definitions that provide a foundation for the discussion of the detailed operational changes are presented below.

- *Non-precision approach (NPA)* – Non-precision approach services support approach operations between 3 miles and 1 mile of visibility. Non-precision approaches are based on radio navigation for horizontal guidance; the vertical guidance is based on barometric altimetry. LNAV criteria define non-precision

approach procedures for RNAV. Display within the cockpit varies by manufacturer of the airborne equipment, but generally can be thought of as similar to the localizer displays; i.e., with variance from course centerline displayed on the cockpit instrument as simple displacement of the indicator needle from its center point.

- *Approach with Vertical Guidance (APV)/Lateral Navigation/Vertical Navigation (LNAV/VNAV)* – FAA Order 8260.48 (RNAV Instrument Approach Procedures) was published in 1999 and includes a new minima line supporting instrument approaches with vertical guidance. Since its publication, ICAO has standardized the term APV to denote this capability. LNAV/VNAV is the actual minimum line that denotes the provision of vertical guidance to a decision altitude (DA) in lieu of a minimum descent altitude (MDA) associated with non-precision approaches.
- *Precision approach (PA)* – Below 1 mile visibility, increasing levels of precision approach operations require increasing levels of airport runway capability including airport runway lights, approach lights, runway visual range, and precision approach services.
- *Category I* – Category I operations support stabilized approach to as low as a 200' decision height, depending on obstacles and runway capability. Medium intensity runway lights (MIRL) and approach lighting systems reduce visibility minima to ½ mile. Touchdown zone RVR sensor and high intensity runway lights (HIRL) allows reduction in visibility minima to 1800 feet RVR. An airport capable of supporting scheduled air carrier service (part 139) requires appropriate runway construction, markings, and signage to support PA operations.
- *Category II* - Category II operations support stabilized approach to as low as a 100' decision height. A more accurate, higher continuity PA signal, high approach lights (ALSF-2) and rollout RVR sensor enable Category II operations.
- *Category III* – Category III operations support stabilized approach, landing and rollout operations all the way to touchdown. A more accurate, higher continuity signal and mid-point RVR sensor enable Category III operations.

Scope and Applicability

Near-Term

- *New RNAV Procedures.* A total of 129 new RNAV procedures have been designed for the FAA's 31 benchmark airports. Approaches for the 576 airports serving Part 139 operations are in development and will be completed by 2006.
- *New precision approach services.* Precision approach capability will be established, improved, or sustained at several runways with ILS, approach lighting systems, runway visual range, and Precision Approach Path Indicator (PAPI).

- None of the FAA qualifiers for new ILSs will be established in the near term. Of the 15 facility mandates in 1999, 10 in 2000, and 28 in 2001, 14 of 53 will be commissioned.
- Critical requirements for two ALSF-2 and four MALSR replacement projects are identified as near-term critical funding needs to avoid loss of approach services.
- The requirement to sustain ground based navigation aids will be approved.
- Previously identified safety needs for PAPI and distance measuring equipment will be analyzed.

Mid-Term:

- A number of ILSs and associated ancillary aids will be installed at selected runway to provide new precision approach capability. The remaining 39 congressionally mandated locations will be satisfied. New ILS qualifiers will be established, and ILS sustain equipment will replace deteriorating equipment, dependent on approval of validated funding requirements.
- WAAS will provide instrument approach services to LNAV/VNAV minima NAS-wide at locations where only non-precision approaches exist today. Most of the approaches at the Part 139 airports will be completed in the mid-term, with the balance completed by 2006.
- LAAS will provide precision approach services to Category I minima beginning in 2003.
- RNAV Instrument Approach Procedures: 780 public airports with runways over 5,000 feet long will receive RNAV procedures over the mid term extending into the long term, to be completed by 2010.

Long-Term:

- WAAS service planned for upgrade to Category I capability. A WAAS upgrade decision will be made in 2002. A decision on how far to reduce the existing ground-based infrastructure will be made in 2006. LAAS Category I approach procedures will continue to increase in 2004 and beyond. Of the 160 airports planned for LAAS services, 114 airports will support Category II or Category III operations, and the remaining 46 will support Category I procedures.
- Although approximately 1,100 NAS runway ends are quipped to support PA service, many of the approximately 3,000 NPA runway ends in the NAS require airport infrastructure upgrades to support PA services. Visibility minimums of 1 mile can be supported with visual runway markings and low intensity runway

lights (LIRL) for nighttime operations. Medium intensity runway lights (MIRL) and precision or non-precision runway markings are required to reduce visibility minima to $\frac{3}{4}$ mile. To establish $\frac{1}{2}$ mile-visibility minimums the additional equipment requirements are precision runway markings, MIRLs for nighttime operations, and an approved approach lighting system.

- For most paved public airports, GPS/WAAS precision approaches will support the publication of minima to one mile visibility without requiring significant airport improvements in marking, lighting, and signage; however, only Part 139 and public airports with 5000' runways will have instrument approach procedures by 2010. Procedures for the remaining 1,300 public airports with paved runways (with runways less than 5,000 feet) will be completed after 2010.

Key Decisions

- FAA and users will determine end-state services for WAAS and LAAS systems (technical feasibility and economic issues) before deployment, aircraft equipage, and ILS decommissioning begins.
 - Key decision points are 2002 to determine the WAAS upgrade path, and
 - 2006 to determine which ILS facilities will be decommissioned.
- Definition of WAAS and LAAS concept and procedures. The LAAS ConOps was completed in 2000. A SatNav ConOps is still in draft. Neither have been signed out by the FAA. A review of the LAAS ConOps needs to address changes in the Ground Based Augmentation Systems (GBAS) Performance Spec – Annex 10.
- Complete Advisory Circulars (AC) 120-29A, 20-RNP and 90-RNP. Completion of AC 120-29A, 20-RNP, and 90-RNP RNAV. AC 120-29A is a Category I/II AC. ACs 20-RNP and 90-RNP RNAV provide the certification and approval basis for RNP RNAV as defined by RTCA DO-236A/EUROCAE ED-75A. Criteria for RNP RNAV Standard Instrument Approach Procedures (SIAPs) are contained in draft Order 8260.RNP. All of these documents are currently “on-hold” and an expected publication date is now at least 18 to 24 months from the initial meeting of the Terminal Area Operational Aviation Rulemaking Committee scheduled for December 2001.
- Approval of Global Navigation Satellite System (GNSS) Standards and Recommended Practices by ICAO States. ICAO GNSS SARPs were introduced as part of Amendment 76 to Annex 10. Their effective date was November 1, 2001. Amendment 77 will contain revisions to SARPs, including GBAS Positioning Service and changes resulting from the newly published GPS Standard Positioning Service Performance Specification.

Key Risks

- Funding to develop, procure, install, and commission the above planned services.
- Geo-stationary satellite leases/acquisition risk for WAAS service.
- Timing and availability of WAAS/LAAS services.
- Voluntary user equipage and usage of WAAS/LAAS avionics/capability.
- Schedule for production version of WAAS/LAAS receiver.
- Planning for markings, signage, and lighting for precision approach runways.
- Environmental and airport infrastructure constraints.

AW-1.2 Continue arrival operations to closely spaced parallel runway as weather deteriorates from VMC to IMC through the implementation of new services.

Scope and Applicability

The intended benefits of PRM include increased throughput, reduced delays, and improved fuel savings. PRM was originally developed under Congressional mandate for five sites. There was no mandate for specific locations. Candidates were initially developed for airports using the 3,000 feet between runway centerlines standard. The FAA originally selected JFK, MSP, STL, ATL, and PHL as candidate airports. The Administrator agreed to reprogram the ATL PRM to SFO and a commitment was to accommodate ATL at the appropriate time.

Beyond the initial five sites for the PRM System, up to two other sites will receive PRM to support closely spaced runway operations in IMC and offer SOIA in deteriorating VMC.

Near-Term

- *National* SOIA standards will be developed with the user community. The final version of draft Order 8260.XX was forwarded to the SOIA Steering Committee hosted by Air Transport Association for comment. The SOIA order is currently being finalized by AFS. Associated air traffic document changes and flight standards handbook bulletins are being finalized.
- PRM at SFO and JFK

Mid-Term

- Further site-specific SOIA procedure development as new PRM sites are approved and utilized.

- PRM at ATL

Long-Term

- Further site-specific SOIA procedure development as new PRM sites are approved and utilized.

Key Decisions

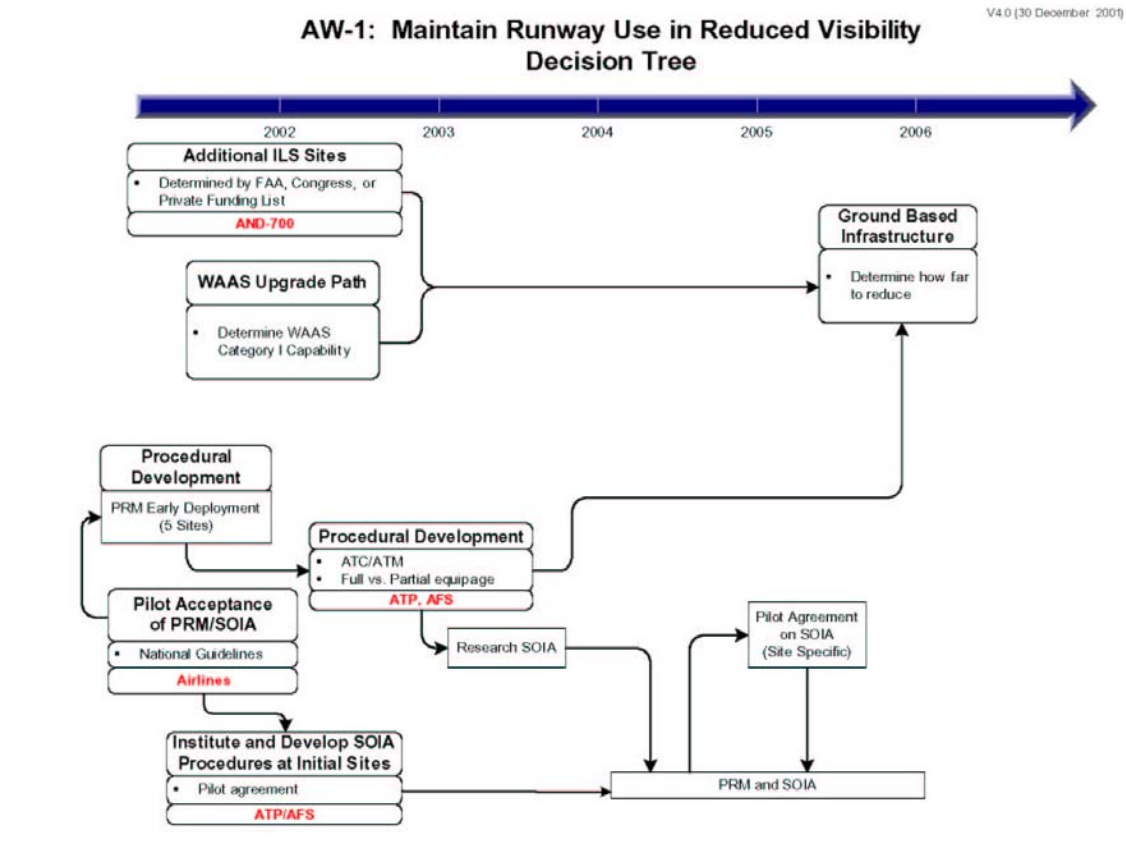
- Finalization of PRM/SOIA procedures.
 - SOIA approach design criteria
 - PRM pilot training requirements

Key Risks

- Efficiency benefits may not be realized unless pilots and operators fully support and accept PRM-SOIA procedures.
- PRM-SOIA procedures are dependent on specific runway configuration. It may not be possible to conduct PRM-SOIA at every airport.

Funding PRM Supportability Action Plan.

AW-1 Decision Tree



AW-1 Responsible Team

Primary Office of Delivery
Mike Cirillo, ATP-1

Support Offices
AND-700
AFS-400
ASC-1
AND-500
AVN-1
AIR-100

AW-1 Links To Architecture

Air Traffic Services / Navigation / Airborne Guidance Capability

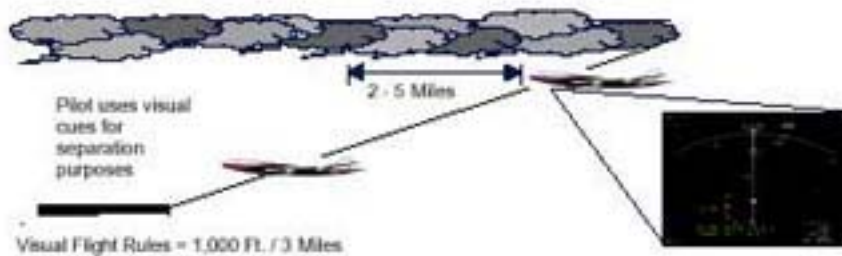
[107103](#) - Low Cost Area Navigation Cruise to All User Using SATNAV

[107104](#) - Current Precision Approach

[107105](#) - Cat-I Precision Approach and Departure Guidance

[107107](#) - Cat I-II-III Precision Approach Using LAAS

AW-2 Space Closer to Visual Standards



Procedures for visual approaches require that the pilot visually acquire nearby aircraft as well as the runway. In marginal visibility conditions, pilots may have difficulty visually acquiring the runway or nearby aircraft, reducing arrival rates. Cockpit tools and displays can help to achieve higher throughput by enabling more rapid identification of aircraft, reducing the need for additional communications between the pilot and controller to advise on traffic. The cockpit display indicates target aircraft and trajectory information which the pilot can correlate to what is visible, providing faster target identification and helping the pilot maintain visual separation.

Key Dates

Concept of Operations for "CDTI Enabled Flight Rules"	2002
Human in the-Loop Simulations	2002
CEFR Flight Testing	2003
CDTI Enabled Flight Rules at Key Site	2004

AW-2 Solution Set

Using cockpit tools and displays to achieve VMC throughput capacity in all weather conditions.

Background

The difference between Visual Meteorological Conditions (VMC) and Instrument Meteorological Conditions (IMC) capacities are significant – for example, at San Francisco Airport, VMC arrival rate is 60/hour; this degrades to 30/hour when visual approaches cannot be performed. Typically, 30-40% of capacity is lost when weather criteria forces the airport to an Instrument Flight Rules (IFR) operations in IMC¹.

Most airports have established weather minima below which visual approaches cannot be conducted, primarily due to the difficulty for the pilot or controller to visually acquire the runway or traffic in such weather. Currently, the requirement for visual approaches is ceiling 500 feet above minimum vectoring altitude and visibility 3 miles. However, other environmental conditions such as haze, sunlight, smoke, and patchy clouds may effectively prohibit visual approaches at higher ceiling and visibility values.

The use of “Cockpit Display of Traffic Information (CDTI) Enhanced Flight Rules” may present pilots with an opportunity to use CDTI as an extension of the eyes, thus enabling visual approach operations to continue in marginal VFR, and potentially down to instrument conditions. This will be researched to determine what needs to be done to make this a viable capability.

Ops Change Description

The operational change for this initiative is described in the following sections:

- AW-2.1: “Enhanced Visual Approach” has already been granted Supplemental Type Certification (STC) approval.
 - *Cockpit*: This initial capability helps the pilot, through the use of the CDTI, to visually acquire and identify an aircraft that has been referenced as traffic by Air Traffic Control, so the controller may clear the aircraft for a visual approach. The CDTI enables quicker identification since the pilot will be able to correlate the target aircraft and trajectory information from the CDTI to the actual traffic as seen out-the-window. Another objective is to better enable the pilot to obtain and maintain visual separation once it is initially established.
 - *ATC*: With quicker identification of pertinent traffic, the need for additional traffic advisories or follow-on interactions between the pilot and controller should be reduced. No changes to 7110.65 (ATC procedures) are required for this initial application.

¹ Table 1 in the FAA *Airport Benchmark Capacity 2001* report contains additional detail on the specific capacities lost at the 31 top airports in the NAS between visual approach conditions and instrument conditions.

- AW-2.2: The Continued Visual Approach being researched to determine what needs to be done to make this a viable capability. Continued Visual Approach will allow a visual approach to continue during periods of intermittent loss of visual contact, bridging the gap between VFR minimums and the higher minimums at which visual approach operations are terminated today. This application would be especially effective in restoring lost capacity at airports during conditions of darkness, haze, fog, other obscurations, thin cloud layers or marine layers.
 - *Cockpit*: In this level, if visual contact with traffic has already been established while in-trail during a visual approach, and that traffic has been correlated with CDTI symbology, then CDTI may be approved as an extension of the pilot's eyes to allow short-term loss of visual contact. Visual contact must be re-established by 1,000 feet above ground level (AGL) and continue to a legal visual approach under Visual Flight Rules (VFR) airport conditions.
 - *ATC*: This may allow visual approach operations to continue as long as VFR conditions exist at the airport. Changes required may include additional phraseology to clearly define the procedure being authorized, but will not require significant changes to ATC technique.

Benefits, Performance and Metrics

- Reduction in en route delays resulting from better flows into airports.
- AW-2.1: Improved airport arrival rates. Operational experience, and pilot and controller acceptance of Enhanced Visual Approach has a potential of 1%-3% improvement in airport arrival rates at Louisville/Sandiford Airport (SDF).
- AW-2.2: Extended visual approach operations and arrival rates into lower weather conditions. Potential 30% regain of lost capacity during weather minimums between current visual approach minimums and basic VFR minimums.

Additional Benefits: See *Safe Flight 21 Pre-Investment Analysis Cost Benefit Analysis Phase II Report*, 1 May 2001

AW-2.1 Enhanced Visual Approach Scope and Applicability

- Currently being tested at SDF
- In-service evaluation and metrics collection at key site SDF – ongoing

- Expansion will be on airport-by-airport basis. Selection will be based on equipage capability.

Key Decisions

- UPS continued commitment to equip entire fleet with approved Level 1 avionics.
- Site selection based on collaborative decision between affected parties (e.g.: aircraft operator/pilots/FAA)

Key Risks

- Managing change in the acceptance of new procedures based on new technologies.
- Feasibility of procedures in mixed equipage environment.
- Impact of mixed equipage on achievement of benefits.

AW-2.2 Continued Visual Approach

Scope and Applicability

- Research is being conducted to determine how a pilot might use CDTI to extend the use of visual procedures in cases of short-term loss of visual contact. A High-level concept of operations for “CDTI Enabled Flight Rules” (CEFR) will be completed in February 2002. Based on this concept, Initial detailed procedures will be developed in the third quarter of FY02. An initial feasibility study including human-in-the loop simulations will be conducted by the end of FY02.
- Upon completion of the feasibility study and a decision to move forward, draft detailed procedures (for AFM/7110.65) will be developed in 1st Quarter FY03. In conjunction with this, an Operational Safety Assessment and High Fidelity Simulations will be conducted in the first two quarters of FY03. Initial flight-testing is planned for the end of FY03.
- Upon successful completing of the initial flight tests, Ops Spec / 7110.65 approval for initial CEFR at key site (SDF) will occur in FY04 (individual aircraft fleet STCs). In-service evaluation and metrics collection at key site to determine the viability of usage will occur in FY04. Expansion will occur on airport-by-airport basis, with selection based on equipage capability.

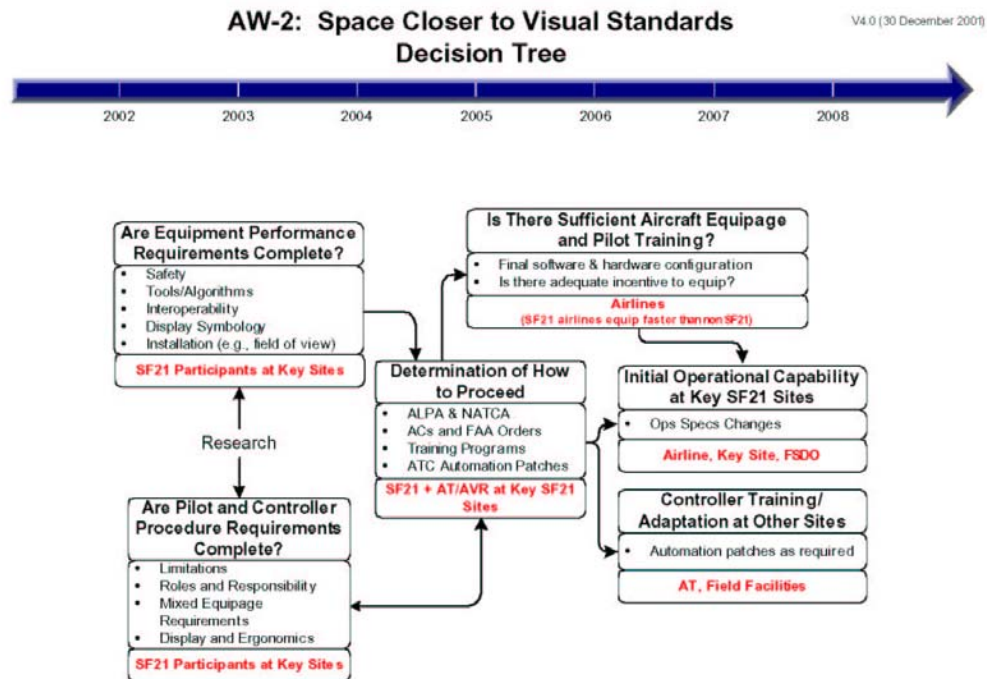
Key Decisions

- Determination of how to proceed with Continued Visual Approach concept based on initial feasibility study.
- Proceed with initial CEFR at key site.
- Site selection based on collaborative decision between affected parties (e.g.: aircraft operator/pilots/FAA).
- Flight Standards / Air Traffic approval of initial concept / procedures.
- Aircraft Certification approval of equipment installation for this application (amended STCs as needed).
- Flight Standards District Office (FSDO) approval of airline Operations Specifications change.
- Satisfactory in-service evaluation.
- Air Traffic (AT) letter of authorization to allow extension of procedure to lower weather minimums at key site.
- AT approval to change of national 7110.65, to allow extension of procedure to lower weather minimums.

Key Risks

- Managing change in the acceptance of new procedures based on new technologies.
- Feasibility of procedures in mixed equipage environment.
- Impact of mixed equipage on achievement of benefits.
- Pilot acceptance.
- Operator acceptance.
- Controller acceptance.

AW-2 Decision Tree



AW-2 Responsible Team

Primary Office of Delivery
Mike Cirillo, ATP-1

Support Offices
AND-500
SF-21 SSG
AOZ-1
ATB-1
AIR-100

AW-2 Links To Architecture

Air Traffic Services / ATC-Separation Assurance / Surface Separation Capability
[102408](#) - Increase Situational Awareness For Pilots By Providing Target Displays - National
[102410](#) - Increased Situational Awareness For Pilots By Providing Target Displays -

Demonstration

Air Traffic Services / TM-Synchronization / Airborne Traffic Synchronization
[104113](#) - Wake Vortex For ATC

AW-3 Reconfigure Airports Efficiently



Changes in wind direction over airport runways, and the onset or end of hazardous weather in the vicinity of the airport often require changes to airport arrival and departure configurations. Weather changes can result in a significant disruption of traffic flow if required configuration changes are not known in advance. With improved airport weather observations and predictions, traffic flow configurations can be proactively planned and coordinated between personnel at all of the involved air traffic control and airline operations facilities. The result will be smoother reconfigurations, optimization of traffic flow and reduced congestion at the airport. Prototypes are currently being used for this purpose at six airports. By the end of 2003 the enhanced reconfiguration capabilities will be available at 34 sites covering 47 airports.

Key Dates

Initial ITWS Deployment	2002
ITWS Deployment Completed	2003

AW-3 Solution Set

Timely planning and coordination of configuration changes during changing weather conditions

Milestones/Key Dates

In-Service Decision: September 2002

Background

Significant changes in wind direction over airport runways, or the onset/end of hazardous weather in the airport environment, often require changes to the airport departure and arrival configurations. Weather changes can result in a major disruption of traffic flow if knowledge of required changes is not known in advance. With this understanding, the FAA is deploying systems that will assist users to make better informed decisions to minimize disruption to traffic flow while maintaining the safety of the system.

Operational Change Description

Accurate information regarding the location and severity of hazardous weather enables optimal use of unimpacted airspace, which yields greater operational efficiency and maximum capacity. Improved weather predictions and observations will allow traffic flow reconfiguration to be proactively planned and coordinated between traffic management personnel in the TRACON, ARTCC, and ATCSCC and dispatchers in AOCs. The result will be a much smoother reconfiguration, optimization of traffic flow, and less congestion at the airport. There are two areas of operational impact addressed below:

AW-3.1: Improved configuration coordination with facilities and carriers.

AW-3.2: Improved procedures for adjacent airport coordination.

Benefit, Performance, Metrics

ITWS provides information to facilitate matching of arrival and departure restrictions to forecasted weather. Traffic flow patterns of inbound and outbound aircraft can be optimized; upstream holding patterns are reduced; congestion on the ground is reduced; and, gate holds and stops are reduced, freeing gates for inbound traffic.

Studies completed at the NYC area airports in 2001 show that on high vertical wind shear days, the AAR is raised by 3 aircraft per hour, per airport, during the event. During convective weather events it was found that 10% more flights departed as a result of ITWS information and arrivals increased by 4 per hour over a two-hour event.

Operational data from ITWS prototypes deployed at major airports have been collected and analyzed on an on-going basis since 1994. It is well documented that ITWS makes a major contribution toward improved airport efficiency by reducing delays during adverse weather. The data show that when ITWS is fully deployed, delay reductions per year are expected to be on the order of 12,000,000 minutes. This translates to approximately \$188M per year in reduced airline operating costs. Total annual economic benefit is estimated at \$625M per year when savings in passenger time are included.

AW-3.1 Configuration Coordination with Facilities and Carriers

Scope and Applicability

Currently, EWR, LGA, JFK, DFW, MEM, MCO are using pre-production prototype ITWS systems for increased capacity in all weather conditions. FAA developed systems have been installed for Operational Testing at the Kansas City and Houston airports. By December 2003 it is planned to have fielded 34 ITWS sites covering 47 airports. ITWS sites are high traffic airports, particularly those in regions where thunderstorms occur frequently.

ITWS will provide accurate current and predicted graphical depictions of the location and movement of terminal weather that will impact airport acceptance rates. TMU specialists, supervisors, and dispatchers will be able to anticipate rather than just react to hazardous weather, and will be able to coordinate the movement of traffic through alternate arrival/departure routes, resulting in overall increases in capacity.

Initial deployment of ITWS will integrate the information from weather sensors (TDWR, NEXRAD, LLWAS, ASR-9) in the airport terminal environment. ITWS will provide runway specific warnings up to 2 minutes prior to occurrence of a hazardous microburst. ITWS will significantly improve the determination of gust front location and intensity and the forecasts (10- and 20-minutes) of future gust front positions. ITWS will provide products indicating the location, extent, and intensity of precipitation, along with the current and 10- and 20-minute extrapolated position, extent, speed, and direction of individual storms. The implementation of these products is expected to improve the anticipation of wind shear impacts through the shared situational awareness available to flight crews and air traffic planners, enable potentially impacted airports to implement safe alternative traffic patterns and achieve higher levels of capacity throughout the impact period. ITWS products will also be provided to External Users through Volpe and intranet access, including Airlines, ATCSCC, NWS, Airport/Port Authorities, and others.

There are no anticipated formal changes to operational rules and procedures. However there will be an overall improvement in coordination and ATC efficiency as the ITWS provides a single, reliable source of significant real-time weather information to users.

ITWS is planned as an evolutionary system. Future enhancements under P3I include the Terminal Convective Weather Forecast product (TCWF), which will provide a 30- and 60-minute forecast of storm motion, a Terminal Winds Graphical product, Lightning Data display, and interfaces to automation systems, such as STARS and ACE-IDS.

The ITWS program has always planned to upgrade the hardware platform when moving from the First Article to production systems. The upgraded hardware is necessary to allow ITWS to stay current with planned improvements and technology advances.

Key Decisions

- The Product team has held fact-finding discussions with the contractor and determined the best solution was a more current hardware platform, which can be accommodated within the current program baseline. The product team, contractor, and senior ATS membership met to discuss the acquisition approach. It was determined the current strategy will meet the program baseline dates with a phased approach for the upgraded hardware changes.
- Need to obtain agreement from both internal and external (e.g., airlines, NWS) users that existing procedures for airport reconfiguration are sufficient to accommodate planned ITWS deployment.

Key Risks

- Maintaining the baseline schedule will be dependent on agreement from FAA unions, especially PASS, on the phased approach to implementing the hardware changes, certification tool, and AF training.

AW-3.2 Procedures for Adjacent Airport Coordination

Scope and Applicability

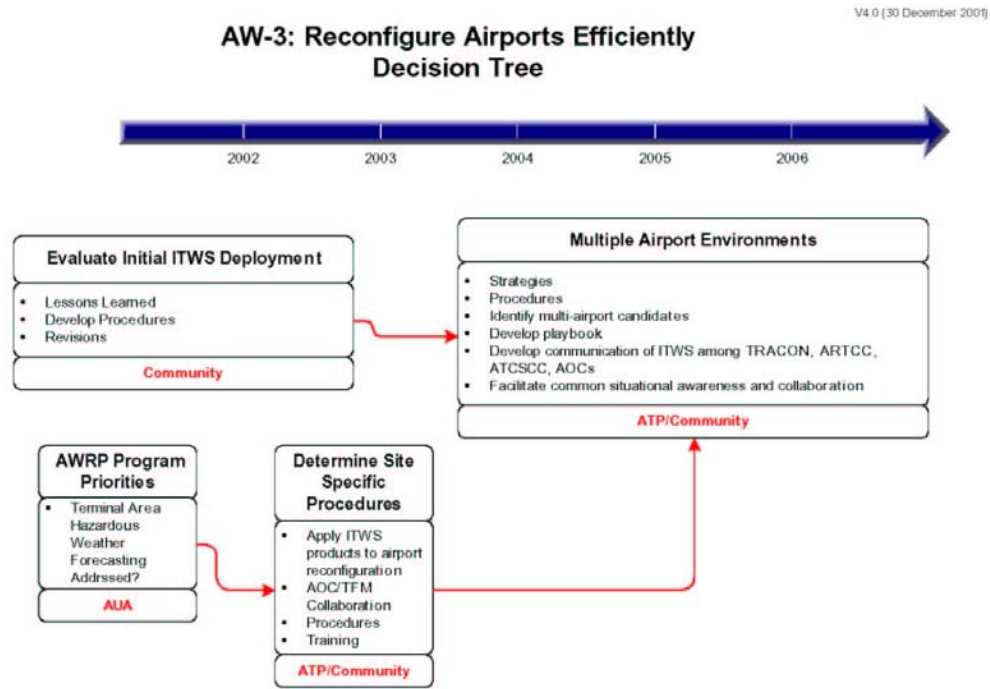
ITWS operations at NY airports (EWR, LGA, and JFK) are addressing adjacent airport coordination. Several other ITWS production sites will also include multiple airport environments.

- Procedures and coordination already in use, including multiple airport sites, will be enhanced by the timelier and more accurate information provided by these systems, providing users better decision-making tools.
- Promote among decision makers common situational awareness of weather scenarios affecting traffic routes and potential reconfigurations.

Key Risks

- Provision of new capabilities might occasionally require some procedural changes.

AW-3 Decision Tree



AW-3 Responsible Team

Primary Office of Delivery
John Staples, ARU-1

Support Offices
AUA-400
ATP-1

AW-3 Links To Architecture

Air Traffic Services / ATC-Advisory / Weather Advisories Capability

[103101](#) - Current Convective Weather Advisory - Terminal

[103102](#) - Terminal Weather Information For Increased Pilot Situational Awareness

[103111](#) - Common En Route and Terminal Weather Situational Awareness

Air Traffic Services / TM-Strategic Flow / Flight Day Management
[105201](#) - Current Flight Day Management